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GEOG-270 Intro Small Unmanned Aircraft

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Past, Present and Future uses of UAS

How many people do you know that own a drone? According to the *Ultimate List of Drone Stats* by Matt Satell, almost 35% of Americans own drones with the majority being men between the ages of 35-44 years old. I thought that stat was surprising knowing that most drones are for recreational use. Satell also stated that 1,662,819 drones are registered through the FAA and that 71% of those drones are registered for recreational use. With that statistic, I wonder how many drones are not registered in the US and I cannot find any information that states a possible statistic. However, most people think of drones as being toys that just fly around to take pictures and to maybe harass people. They would be wrong because drones have taken a major step in commercial use in this century.



One major step that drones have taken is that a company from Hopkinton, Massachusetts called Alaka'I Technologies has developed a drone prototype that utilizes hydrogen fuel cells which allow the use of electric motors but can be used for a very long

time and has an incredible range. One other crazy thing about this drone is that it is designed to carry up to five passengers or a final load of 1000 pounds. When this company debuted its product, they claimed that it has a 400-mile range and a flight time of 4 hours. The top speed of this drone is 118 mph and the refueling process only takes about 10 minutes. This machine also has six rotors and multiple fuel cells. I would say this is a huge step in the use of drones and it is truly taking it to a whole new level.

One other major improvements of drones are the implication of a sort of contactless delivery. What I mean by this is that one of the world's largest shipping companies Amazon has started testing out drones that have the capability of delivering packages to their customers. Regulations and approval from the United States Federal Aviation Administration (U.S FAA) have been keeping the idea up in the air as there are a lot of possible outstanding issues with that off the bat. The one main thing that Amazon would take away from this is the fact that they would not have to pay someone to deliver packages all day. The other thing would be efficiency from house to house or even going across town as it would be much faster. The only thing you lose is the size of packages to be delivered and having to go back and forth with the drone to attach more packages. I would like to see where this ends up in the future.

Drones have taken a turn in the commercial sector. Commercial companies have seen the potential of drones and want a taste for themselves. One statistic shows that in 2012, the value of drone growth was at \$40 million. Then 5 years later in 2017, that value jumped to \$1 billion. One major downfall is that drones are constructed of sophisticated parts and technology that takes a lot of years to create. Once a commercial drone breaks, it can be hard to get one in replacements. Drones truly are a complex machine that has a lot of moving parts.

One major industry that I see a lot of drone usage is the Ag industry. There are truly endless uses for drones when it comes to agriculture. Drones can be used by farmers to check herds of cattle in pastures in those hard to see places in the hills and valleys. They are also used for data analysis in crop scouting. Farmers can use apps to collect data on fields and see if their crops are healthy or if not, they can go out using GPS coordinates to check troubled spots and see if there is a fertilizer deficiency or maybe a pesticide issue. Data analysis can be collected using multispectral cameras or by simply using a go pro type camera with high resolution. One major technology used for grain farmers is called SenseFly. This type of technology can be used for an entire growing season from when the crop is planted to when the crop is ready to be harvested. SenseFly offers a function to give a preharvest prediction as well as a recommended drainage plan for fields that have crazy elevation changes. The three major steps in a growing season using SenseFly is a soil assessment right before the crop is planted. These drones take a soil sample in a grid pattern and will give an assessment and required fertilization prescription for that field. Crop monitoring is the main use of SenseFly as for you it can tell you what parts of the field might need fertilizer or what parts have a high weed pressure and need herbicide.



Pictured to the left is the 9-foot Yamaha Rmax. This drone is specifically designed for farmers to use even though it can be used for anything you want. I just want one of these because it looks cool! This is a fully autonomous helicopter that can carry a 62-pound payload and spray 2 acres

of farmland in 6 minutes. The ag industry to me has the biggest chance for growth using drones

and autonomous equipment to help the bottom dollar go a little further. I think farmers would be ok spending this type of money because the bottom line is, they already are. One other thing about this is the fact that it is a lot more efficient when spraying for say pastures. The average self-propelled sprayer will cost you about \$250,000-\$300,000. A tractor with 600 horsepower will cost you \$300,000 and up if you bought it new. Case IH came out with their autonomous tractor that costs around \$400,000 that has a pulling power of around 350 horsepower. I think a major aspect of having all this self-driving equipment is the fact that you do not have to pay someone for hired help. As a farmer myself, I still think it is still important to have someone watch the equipment especially since you won't know if something breaks.

Another big use of drones is the utilization of surveillance, care package, and fighter UAS in the US armed forces and Police agencies. These drones and helicopter drones are usually equipped with a high-definition camera and infrared sensors for detecting and tracking people and objects in highly wooded areas or hard to see areas like fields and hilly areas that would require lots of manpower. These drones only require two people to fly. Usually, one operating controls and one as a visual observer. The armed forces also have drones that carry weapons to ambush enemies without the need to have allied personal in the area to do the job.

I think that drones are going to continue to advance in the technology spectrum for years to come. I truly doubt that this technology will ever stop because there is so much potential that drones have. Looking into the past year we've and the impact the coronavirus has made on the world, I think that having contactless delivering, shipments and even for delivering medical supplies is going to be normal for a while to come.

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